Docket No. BIO-125

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	: Shlomo Ben-Haim		
Serial No.	:	Art Unit	:
Filed	:	Examiner	:
For	: METHOD FOR MAPPING A HEART USING CATHETERS HAVING ULTRASONIC POSITION SENSORS		

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

In advance of the Office Action for the above-identified application, please amend as follows:

In The Specification:

Please delete the Title and substitute a new title therefor as follows: -- METHOD FOR MAPPING A HEART USING CATHETERS HAVING ULTRASONIC POSITION SENSORS -- .

Please delete the Abstract and substitute a new abstract which is on a separate sheet and enclosed herewith.

Page 1, line 2 after "This patent application is a", please insert -- continuation of US Patent Application No. 09/111,317 filed July 7, 1998, which is currently pending, and is a -- .

In The Claims:

Please cancel Claims 1-265 without prejudice and substitute therefor new Claims 1-36 as follows:

1. A method for mapping a heart comprising the steps of:

inserting a mapping catheter having an ultrasonic position sensor into the heart;

inserting at least one reference catheter having an ultrasonic position sensor into the heart;

determining the position of the mapping catheter relative to the at least one reference catheter; and

mapping a portion of the heart with the mapping catheter.

2. The method according to Claim 1, further comprising determining the position of the tip of the mapping catheter relative to the at least one reference catheter.

3. The method according to Claim 2, further comprising creating a geometric map of the portion of the heart with the mapping catheter based on the position of the tip of the mapping catheter.

4. The method according to Claim 3, further comprising mapping electrical activity of the portion of the heart with at least one electrode mounted at the tip of the mapping catheter.

5. The method according to Claim 4, further comprising reconstructing a surface of the heart based on the position of the tip of the mapping catheter.

6. The method according to Claim 3, further comprising performing a therapeutic procedure on the portion of the heart.

7. The method according to Claim 6, further comprising performing an ablation procedure on the portion of the heart.

8. The method according to Claim 3, further comprising measuring impedance of the portion of the heart.

9. The method according to Claim 3, further comprising measuring mechanical information of the portion of the heart.

10. The method according to Claim 9, further comprising measuring movement of the portion of the heart.

11. A method for mapping a heart comprising the steps of:

inserting a mapping catheter having an ultrasonic position sensor into the heart;

inserting at least one reference catheter having an ultrasonic position sensor outside of the heart;

determining the position of the mapping catheter relative to the at least one reference catheter; and

mapping a portion of the heart with the mapping catheter.

12. The method according to Claim 11, further comprising determining the position of the tip of the mapping catheter relative to the at least one reference catheter.

13. The method according to Claim 12, further comprising creating a geometric map of the portion of the heart with the mapping catheter based on the position of tip of the mapping catheter.

14. The method according to Claim 13, further comprising mapping electrical activity of the portion of the heart with at least one electrode mounted at the tip of the mapping catheter.

15. The method according to Claim 14, further comprising reconstructing a surface of the heart based on the position of the tip of the mapping catheter.

16. The method according to Claim 13, further comprising performing a therapeutic procedure on the portion of the heart.

17. The method according to Claim 16, further comprising performing an ablation procedure on the portion of the heart.

18. The method according to Claim 13, further comprising measuring impedance of the portion of the heart.

19. The method according to Claim 13, further comprising measuring mechanical information of the portion of the heart.

20. The method according to Claim 19, further comprising measuring movement of the portion of the heart.

21. A method for mapping a heart comprising the steps of:

(a) inserting a mapping catheter having an ultrasonic position sensor into the heart;

(b) inserting at least one reference catheter having an ultrasonic position sensor into the heart;

(c) bringing the tip of the mapping catheter into contact with a wall of the heart at a location;

(d) determining a position of the tip of the mapping catheter at the location;

(e) adding the position to a map;

(f) moving the tip of the mapping catheter to a second location; and

(g) repeating steps (d) - (f).

22. The method according to Claim 21, further comprising reconstructing a surface of the heart based on the determined positions.

23. The method according to Claim 22, further comprising mapping electrical activity of the surface of the heart with at least one electrode mounted at the tip of the mapping catheter.

24. The method according to Claim 22, further comprising performing a therapeutic procedure on the surface of the heart.

25. The method according to Claim 24, further comprising performing an ablation procedure on the surface of the heart.

26. The method according to Claim 22, further comprising measuring impedance of the surface of the heart.

27. The method according to Claim 22, further comprising measuring mechanical information of the surface of the heart.

28. The method according to Claim 27, further comprising measuring movement of the surface of the heart.

29. A method for mapping a heart comprising the steps of:

(a) inserting a mapping catheter having an ultrasonic position sensor into the heart;

(b) inserting at least one reference catheter having an ultrasonic position sensor outside of the heart;

(c) bringing the tip of the mapping catheter into contact with a wall of the heart at a location;

(d) determining a position of the tip of the mapping catheter at the location;

(e) adding the position to a map;

(f) moving the tip of the mapping catheter to a second location; and

(g) repeating steps (d) - (f).

30. The method according to Claim 29, further comprising reconstructing a surface of the heart based on the determined positions.

31. The method according to Claim 30, further comprising mapping electrical activity of the surface of the heart with at least one electrode mounted at the tip of the mapping catheter.

32. The method according to Claim 30, further comprising performing a therapeutic procedure on the surface of the heart.

33. The method according to Claim 32, further comprising performing an ablation procedure on the surface of the heart.

34. The method according to Claim 30, further comprising measuring impedance of the surface of the heart.

35. The method according to Claim 30, further comprising measuring mechanical information of the surface of the heart.

36. The method according to Claim 35 further comprising measuring movement of the surface of the heart.

Remarks

The present application is a continuation application under 37 CFR §1.53(b) of parent application US serial no. 09/111,317 filed July 7, 1998 (Applicant's Docket No. BIO-57) which is currently pending. Claims 1-36 are in the case and presented for consideration. Original Claims 1-265 of the parent application have been canceled without prejudice. No new matter has been added. The support for these new claims can be found in the Specification, for example, Page 26, line 24 - Page 27, line 22; Page 28, line 20 - Page 30, line 10; Page 30, line 31 - Page 31, line 4; Fig. 6; Fig. 7; Fig. 10; and Fig. 13.

Accordingly, favorable action is respectfully requested.

Respectfully submitted,

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